House Standing Committee on Transportation

OCTOBER 20, 2015

Kirk Steudle

MDOT

Overview

- Efficiencies & Innovations
- Overview & Summary of 2015 Projects
- Overview of Future Projects
- Questions

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Efficiencies as of 2014

- Total annual & one-time savings from 2011-2014 = $316 million
- 15% staff reductions
- Major reorganization & innovative cost-saving measures saved $55 million in 2011
- $62 million in one-time savings by bond refinancing
- Additional innovative cost saving measures over past 4 years are saving $51 million per year
  - Asset management
  - Energy efficiency
  - Performance measures
  - Construction warranties
  - Innovative contracts
  - Innovative finance
  - New technologies
  - Partnerships

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Major 2015 Efficiencies

- **P3 Lighting Project**
  - 15 year public-private partnership to upgrade 15,000 freeway lights in Detroit; results in $13.5 million in savings
  - Lighting coverage on freeway will increase from 70% to at least 98%
  - Improves performance & safety, creates energy savings, reduces staff time
- **Bond Refinancing**
  - Saved $22 million by refinancing 2006 CTF bonds & 2005 STF bonds
- **Transportation Asset Management System**
  - Leveraged IT solution purchased for other uses, saving MDOT $500,000

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Major 2015 Efficiencies

- **Sharing best practices**
  - Sharing & documenting best practices across all regions conservatively saving $3 million per year
    - LIDAR surveys, tow plows, stringless paving, LED lights, salt pre-mix, Wounded Veterans program, partnering, performance measurement
    - Using technology in new ways to calculate ADA ramp measurements, hold virtual meetings, delineate wetlands, pinpoint endangered plants, communicate more quickly & effectively
- **Oil Change Schedule Revision for Snowplows**
  - UP testing of remaining oil life confirmed potential for savings
  - Reduced frequency of oil changes saves $2,300 annually at St. Ignace garage, with potential to save $50,000 annually statewide

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Major 2015 Efficiencies

- **Adaptive Signal Systems**
  - Real-time volume data collection adjusts signal timing to accommodate volume
  - Installation in Traverse City in 2019
- **Intelligent Compaction**
  - "Smart Roller" compaction technology saves time, fuel & money
  - Improves quality & uniformity of soil compaction before construction begins

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Innovations

- **Supervisory Control and Data Acquisition (SCADA)**
  - 24 pump stations have technology that allow MDOT to monitor status and operate stations remotely
- **MiBRIDGE**
  - Electronic reporting system tracks all bridge related information including inspections, repairs & management data
  - Streamlines decision making, eliminates paper handling/storage, and reduces inspectors' time & exposure to traffic
- **Dilemma Zone Signal Timing**
  - New technology extends yellow and red phases to protect opposing traffic
  - System observes approaching traffic, measures speed & provides a timing extension if a vehicle will not be able to stop for red
  - Improves safety at hazardous intersections

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Innovations & Efficiencies

US 131 over the Muskegon River
External Beam Post Tensioning
Saving Time and Money

Articulated Concrete Block for
Scour Protection
Improved Safety, Lower Cost

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Partnerships

- **Geosynthetic Reinforced Soil – Integrated Bridge System**
  - Partner with USDOT & Ionia County Road Commission to implement & showcase innovative small bridge reconstruction techniques that reduce costs 20-60%
- **Mi-TIME program (Michigan Traffic Incident Management Effort)**
  - National traffic incident management training for first responders with Michigan specific laws
  - Over 2,327 Michigan first responders trained in safe, quick clearance of traffic incidents

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National Recognition

- **I-96 Fix**
  - 2015 AASHTO President's Transportation Award
    - Acknowledges outstanding projects that are making travel safer & better across the country
- **M-231 Bridge Project Awards**
  - Project Winner in 2014 America's Transportation Awards
    - Acknowledges state DOT's that are leading the way in bringing high value for public's investment
  - Governor's Award for Historic Preservation for archaeological discoveries

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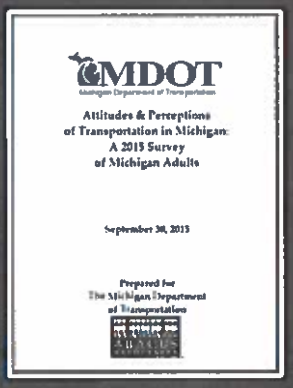
2015 Attitudes & Perceptions Survey

- Survey developed to obtain public input into state long range transportation planning process
- 74% satisfaction with MDOT overall
  - Same percentage in 2013 and 2014
  - Slightly better than 2011's 73% satisfaction rating
- Those who were dissatisfied cited:
  - Road conditions
  - Lack of funding


MDOT

Attitudes & Perceptions of Transportation in Michigan: A 2015 Survey of Michigan Adults

September 30, 2015

Prepared for The Michigan Department of Transportation

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MDOT Construction On Budget

Five Year Summary of MDOT Projects

Calendar Year	Original Contract Cost	Final Contract Cost	Percent Difference
2010	$615,818,259.64	$615,142,561.83	-0.11%
2011	$833,072,906.02	$842,999,015.92	1.19%
2012	$771,130,483.23	$768,530,401.94	-0.34%
2013	$1,127,211,347.22	$1,139,133,968.99	1.06%
2014	$645,898,553.12	$649,413,716.71	0.54%
2015	$495,098,711.00	$499,981,520.79	0.99%

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2015-2019 Five-Year Transportation Program

- $503 million invested annually to repair and rebuild MDOT roads
- $168 million invested annually to repair and rebuild MDOT bridges
- 115 lane miles of roads reconstructed annually
- 270 lane miles of roads rehabilitated annually
- 1,350 lane miles of roads addressed with capital preventive maintenance annually
- 108 bridges preserved or repaired annually

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Highway Capital Program

Highway Capital Program (in millions)	FY 2015	FY 2016
Total Repair and Rebuild Roads and Bridges Program	$701.97	$813.70
Routine Maintenance	$310.50	$310.69
Capacity Improvements	$ 0	$16.26
Safety and System Operations	$125.76	$130.92
Transportation Alternatives	$14.73	$17.23
Roadside Facilities	$3.03	$3.03
Workforce Development	$7.00	$7.00
Non-Federally-Funded Programs	$27.24	$27.67
Total Highway Capital Program	**$1,190.23**	**$1,326.50**

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Three major freeway closures/tanker fires:

March 11, 2015 Tanker Incident
on I-94 EB Near Michigan Ave

- Damage to 300 Feet of Mainline I-94 Pavement
- Burning Fuel Drained Into 5 Pump Stations, Which Were Shut Down
- Emergency Repair Contract Bids Opened on March 12
- Crews Worked Non Stop for More Than Two Days to Perform Repairs
- Freeway Re-opened on March 14 At 5:00 pm

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Three major freeway closures/tanker fires:

May 24, 2015 Tanker Incident
on I-75 @ I-375 Downtown Detroit

- Truck Traveling 61 mph on 25 mph Curve
- 9000 Gallons of Unleaded Fuel Leaked and Burned on the Bridge, Roadway & Storm Sewer
- Emergency Bridge and Road Repair Contract Bids opened on May 25
- Work Complete – One Lane Open on Bridge on Saturday, May 30

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Three major freeway closures/tanker fires:

August 19, 2015
I-75 SB near Outer Drive in Melvindale

- Mainline pavement and shoulder damage (full cross section), 200 feet of barrier wall damage 210 feet, also, median light standard and foundation destroyed due to fire.

- Emergency contract let date – August 20, 2015
- I-75 re-open date – August 23, 2015

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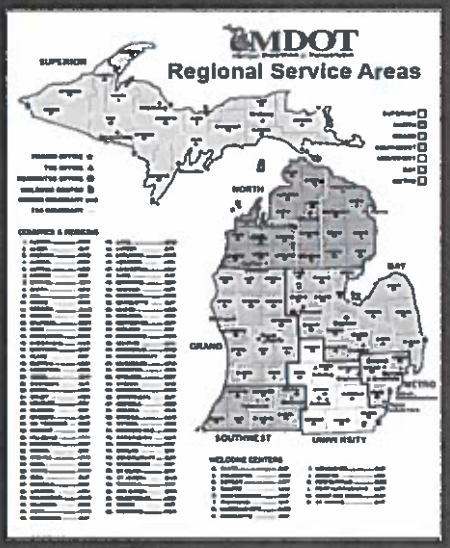
Project Highlights



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Bay Region

- M-20 Bridge over the Tittabawassee River, Midland: $16 million
- I-69, City of Flint: $37.3 million
- I-75 from Dixie to Hess, Saginaw County: $42.5 million

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Grand Region

- Completion of I-96 at Cascade Road Diverging Diamond Interchange: $15.8 million
- US 31 Rehabilitation, Muskegon and Oceana Counties, Fruitvale to Winston Roads: $12.6 million
- M-11 Roundabout, City of Walker: $5.7 million
- US 131 over the Muskegon River: $5 million

Future Projects

- US 31 from 8th Street to Quincy, reconstruct and widen, Holland & Holland Township: $28.5 million

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Metro Region

- I-94/I-69 Interchange: $84 million
- I-69 EB from M-19 to Taylor Road: $47.4 million
- M-53 from Red Run Drain to 18 Mile Road: $42.1 million
- University Drive over I-75 Diverging Diamond Interchange: $24 million
- M-14 and I-275: $5.6 million

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Metro Future Projects

- I-75 over the Rouge River
  - Largest bridge on state system
  - Other bridges associated with it
    - I-75 over Fort Street
    - I-75 over Goddard
  - Among the poorest bridges in Metro region
  - Scheduled to let in December 2016, completion in late 2018
- Expected to cost between $120 million and $150 million

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North Region

- US-31 north of Alanson roadway failure:$1.2 million
- US-31, East Bay and Acme Township $2.2 million

- Future Projects
  - US-23 over the Black River in Cheboygan: $1.7 million
  - US-23 from Tawas Beach Rd to Kirkland Drive, Iosco County: $14.7 million

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Southwest Region

- US-131 Stadium Drive Interchange: $21.6 million
- I-94 Interchange at Sprinkle and Cork Roads: $15.9 million

- Future Projects
  - I-94 at Michigan Avenue (40th Street)
  - I-94 Red Arrow Highway (Exit 20) to I-94 BL (Exit 23)

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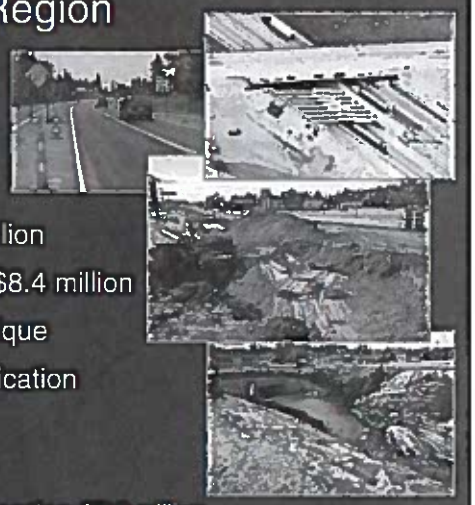
Superior Region



- US-2 in Ironwood: $6.9 million
- US-2 in Manistique: $1 million
- I-75 in Chippewa County: $4.5 million
- US-41, Portage Lake Lift Bridge: $8.4 million
- M-94 project coordination, Manistique
- M-134 Pure Michigan Byway Dedication

- Future Projects
  - US-41 Hancock Downtown Reconstruction: $7.3 million

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University Region

- I-96 over US-23 and Old US-23

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Lansing State Journal

A GANNETT COMPANY

MDOT improves warranty oversight

Justin A. Hinkley, Lansing State Journal 5 a.m. EDT September 8, 2015

By March, all warrantied jobs will be properly documented, inspected and fixed, MDOT says

(Photo: Rod Sanford/The Lansing State Journal)

LANSING — Seven months after a biting audit and a verbal lashing from lawmakers, Michigan Department of Transportation officials say they're doing a better job holding contractors accountable for warrantied road work.

In another six months, the department will have built a system where all warrantied jobs are properly documented, inspected and fixed, members of MDOT's Warranty Improvement Team said last week. This year, 112 highway jobs were covered by a warranty, MDOT spokesman Tim Fischer said.

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Warranty Audit Commitments

- May 2015: MDOT will provide direction to personnel for final inspections when warranties have expired prior to inspection. COMPLETE
- October 2015: Develop a procedure for non-responsive contractors required to perform warranty work. NEARLY COMPLETE
- March 2016: Further strengthen policies and procedures to ensure that required warranty inspections are timely, completed, and documented prior to warranty expirations. COMPLETE AND ONGOING
- March 2016: Strengthen oversight and monitoring process to ensure warranty work is completed. ONGOING
- March 2016: Implement a process to ensure all warranted projects are included in the SWAD database. COMPLETE AND ONGOING

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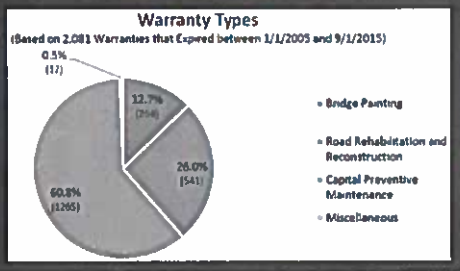
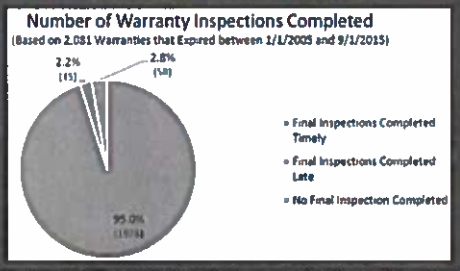
Warranty Program Analysis

- Audit statistics were based on sampling of "judgmentally selected warrantied projects" as reported out by Auditor General
- MDOT performed complete review of warranties (2081) that expired between Jan. 1, 2005 & Sept. 1, 2015
- The following charts show results of analysis:





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Rail Cars

- Stopped lease payments Sept. 30th
- Working with Great Lakes Central RR (GLCRR) to finalize details for contract that will:
  - Protect states investment in cars by keeping them available for up to 5 years
  - Agree on lease rates & terms for future use of cars
  - Cost sharing arrangement if GLCRR sells cars
  - Allow GLCRR to lease cars on interim basis
- Agreement took longer than anticipated because of availability of key people in negotiations
  - Should be completed late Oct earlier Nov

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Questions?

MDOT Economies, Efficiencies, and Innovations

Cumulative list of reported savings: FY 2010 to FY 2015

MDOT Cumulative Annual Savings	$114,707,878
MDOT One-Time Savings	$201,223,897
MDOT Total Cumulative Savings (Annual and One-time Savings)	$315,931,775
2013-14 Cumulative Savings to Partners and Customers	$14,864,000

2014 Total Savings	$148,985,167

Year	Description	Annual MDOT Savings	One-Time MDOT Savings	Annual Savings to Others
2014	**State Trunkline Funds (STF) Bond Refinancing** - Refinancined $265 million in STF bonds to achieve interest savings of nearly $23 million based on present day value.		$22,974,744	
2014	**Comprehensive Transportation Fund (CTF) Bond Refinancing** - Refinanced $10.7M of CTF bonds for interest savings of $917,040 over remaining life of bonds; The bulk of these savings to occur in FY14 of $798,519. The benefit of these savings are 2/3 to Aeronautics and 1/3 to CTF.		$798,519	
2014	**e-Construction/Tablets** - more than 600 users (management, inspectors, materials staff, etc) using e-construction techniques and tablet computers have reduced costs, materials, and time, conservatively saving $21,430,000 annually.	$21,430,000		
2014	**Bike Map e-Store** – Over 600 map requests at $5 each generated $3,000 and $15,000 savings annually from not contracting map mailing services. Additionally, processing time has been cut from 6 weeks to less than 1 week (2-4 day turnaround).	$18,000		
2014	**Adobe Connect Webinars** - By conducting meetings using the Adobe Connect web conferencing platform, the Intermodal Policy Division is saving money by reducing travel costs and travel time for staff and meeting participants, while still assuring good communication. In 2014, IPD conducted four Tribal government planning meetings. Conducting these planning meetings by webinar resulted in substantial cost savings, particularly for the Tribal meetings because they were held with the Keweenaw Bay Indian Community, whose Baraga offices are a 900 mile round trip from Lansing. Staff time and travel were also saved by the MDOT Ishpeming TSC and Marquette DNR (partner).		$9,500	$500
2014	**Non-Trunkline Federal Aid Program (NTFA) Agency Coordination** - The NTFA Road Program, within the Asset Management Division, is a cross-agency traffic data collection program created to meet additional requirements of FHWA's Highways Performance Monitoring System (HPMS) set in 2010, which directs that each state develop and implement a Traffic Monitoring System for Highways program on all federal aid eligible roads. Coordinating with local agencies to submit traffic data has saved MDOT $1,529,400 over the past 6 years.	$254,900	$1,274,500	
2014	**Mio-Vision Technology** - The Data Collection and Analysis Section within the Asset Management Division have been using Mio-Vision units which record vehicle classification and intersection turning movement data utilizing a camera sensor. The data is transmitted back to Mio-Vision which then processes the data and returns a formatted file back to MDOT. Using these units can allow one person to perform seven classification counts for the same cost as the one person performing one class count.	$230,000		

Year	Description	Annual MDOT Savings	One-Time MDOT Savings	Annual Savings to Others
2014	**Federal Emergency Management Agency (FEMA) Homeland Security Grant Program Urban Area Security Initiative** – Grant funds, instead of state funds, were used to purchase traffic signal modules and emergency route signs.		$61,750	
2014	**Nontrunkline Federal-Aid (NTFA) Program** - The NTFA road network has combined road segments, minimizing the number of traffic counts needed to meet the federal requirement. Consolidation of traffic segmentation on MDOT-Asset Management Division collection of NTFA has saved MDOT $133,950.	$133,950		
2014	**Michigan Airport Directory Mobile Application (MiAirports)** - The Office of Aeronautics in collaboration with MDOT and DTMB staff developed a mobile application to supplement the printed and online versions of the Michigan Airport Directory. Initally developed to provide additional access to information on Michigan airports, this mobile application has the potential to replace the paper copy of the directory thus saving printing costs of approximately $25,000 annually. Additionally, the mobile application will save staff time required for editing and approval of the printed version of the directory.	$25,000		
2014	**Aircraft Registration Payment Website** - The implementation of the Office of Aeronautics online aircraft registration payment website allows aircraft owners to go online to pay their registration renewal. The ability to complete online payments versus mail or over the phone payments saves approximately 80 hours of staff time annually. In addition, lock box fees have been eliminated and mailing costs have been reduced. The convenient payment option also benefits customers through reduced mailing costs since the customers are no longer required to send checks.	$4,000		$1,500
2014	**Carpool Lot Partnership** - MDOT continued its partnership with Meijer Corporation to add a 19th store to the carpool lot agreement. The three additional stores added in 2014 will provide parking for up to 150 commuters and save the Department approximately $900,000 in construction and real estate costs. This partnership model has also been used in the Upper Peninsula; MDOT has agreements with seven local businesses that provide parking capacity for commuters. Since 2008, this partnership has saved approximately $5.7 million in real estate and construction costs.		$900,000	
2014	**Reduction of First Aid Injuries** – Reduced the number of visits to medical clinics for minor first aid and/or poison ivy.		$5,000	
2014	**e-Pub Accident Prevention Plan** – Reduced the cost of publishing the Accident Prevention Plan by having the e-Pub version available to employees.	$2,000		

Year	Description	Annual MDOT Savings	One-Time MDOT Savings	Annual Savings to Others
2014	**Performance Based Rest Area Contracts** - To improve the cost-effectiveness of rest area maintenance, the North Region developed a performance-based rest area maintenance contract for the Hebron and Topinabee rest areas. This contract pays the contractor a fixed amount to maintain the facilities, and then measures their performance against set condition standards. If the standards are not met, the contractor is penalized. This contract allows the Region a cost savings of over 15%.	$18,000		
2014	**Inter-agency Catch Basin Crews** - During the summer of 2014 the maintenance coordinators at the North Region TSC's partnered with staff from county road commissions and municipalities to more efficiently complete catch basin cleanout activities. When compared with prior years when a private vendor was utilized, the new method was more cost effective and provided a higher quality outcome.	$15,000		
2014	**Rural Freeway Mowing** – Starting in 2013, the Gaylord TSC implemented a three-year mowing/spraying method for the I-75 corridor for low and high-growth areas leading to a $40,000 annual reduction.	$40,000		
2014	**"Bridge Slide"** - Deployment of accelerated bridge construction techniques in the form of 3 bridge slides in Grand Region. User delay costs were reduced by $3 million on M-50 over I-96, and $2.9 million for both US-131 structures over 3 Mile Road.	$5,900,000		
2014	**Fleet Reduction** -The Bay Region developed a fleet assignment chart to determine vehicle assignments by position/duties. Utilization is then monitored annually to "right size" light fleet in the Bay Region.		$216,000	
2014	**Energy Savings** - The Bay Region installed LED lights in many facilities and all signals to reduce the overall energy usage and costs around the region. In addition to saving energy, LED lights require less overall maintenance, changing re-lamping from every year to approximately every seven or eight years.	$500		
2014	**Bridge Repairs** - The Bay Region fabricated a float that allows riprap to be installed in scour areas of culverts or small bridges. Riprap prevents debris from falling into the water and can be loaded into the float on the road, put into the river with a crane truck and floated into the culvert/bridge. When the float is above the scoured location, a ripcord can be pulled that drops the riprap into place.	$900,000		
2014	**Monitoring Traffic** - Also with the 2014 pavement rehabilitation project on I-75 in Genesee County, the Slow Stopped System was provided which monitors active traffic speeds. When traffic was slowed or backed up, Dynamic Message Signing was activated to suggest alternate routes for the traffic.	$20,000		
2014	**Pothole patching** - The use of asphalt instead of cold patch when asphalt plant is open. Hot mix lasts much longer than cold patch and is about half the price per ton. This reduces the number of times that crews are out on the roadway applying material in traffic and allows them to perform other duties.	$4,000		

Year	Description	Annual MDOT Savings	One-Time MDOT Savings	Annual Savings to Others
2014	**Pothole Patching Mix** - Purchased an asphalt recycler to recycle broken asphalt during winter months when asphalt plant is closed. This allows our maintenance crews to apply a hot mix during the cold weather months and as noted above, spend less time fixing pot holes.	$4,000		
2014	**I-75, Reconstruct Dixie to Hess** – Piloting several innovations including Dispute Review Board, fluorescent barrels in tapers, median barrier wall mounted temporary sign, and movable concrete barrier wall.		$6,000,000	
2014	**Skype** - Bay Region used Skype and Facetime for interviewing out of state candidates. This worked out much better than standard phone interviews as a face could be placed with the answers.			$2,000
2014	**New Computer-Aided Design and Drafting (CADD) file management** - Bay Region Design is investigating a new CADD file management technique that simplifies the level control of reference files.		$25,000	
2014	**Epoxy Injection** - Bay Region assisted on a construction project for the M-90 Bridge over Black River. Crews epoxy injected existing deck delamination in lieu of chipping and patching these areas. Epoxy injection of deck delamination is a new process (shared from Iowa DOT) that structurally bonds concrete areas. This process saved the contractor and MDOT the necessary 30 days cure time had these areas been chipped and patched, prior to placing an epoxy overlay wearing surface on the bridge. This next season, the contractor will not need to patch		$17,000	
2014	**Geotextile and hydrophilic expanding polyurethane products** - This summer there was a settlement problem with an 84" concrete culvert on M-47 just north of M-46. Embankment material was getting drawn in between separated pipe joints. Bay Region staff along with Bridge Field Service staff added geotextile in the joint separations, used hydraulic cement to seal the pipe joint, and then injected a hydrophilic expanding polyurethane product into the surrounding soil around the pipe's exterior, sealing the joint. This was done without disturbing traffic and/or open cutting to replace pipe.		$500,000	
2014	**Smart phone apps** - Bay Region will be using a smart phone application to collect locations of invasive species into a GIS layer. The spray crew will use this inventory to seek the most effective way of treating invasive plants within the Region. This also allows the spray crews to monitor the effects of treatment and find the most effective treatments for each species.	$2,500		
2014	**GPS unit** - Bay Region purchased a GPS unit to facilitate wetland delineation, locate new tree plantings and to evaluate noxious weed spraying with the Region.	$8,000		
2014	**Tracking spreadsheet** - Bay Region made a tracking spreadsheet in Excel to monitor planned and actual milestone dates for all of the projects requiring ROW in the region. These spreadsheets are used for the status meeting to give a visual aid when discussing projects.	$12,000		

Year	Description	Annual MDOT Savings	One-Time MDOT Savings	Annual Savings to Others
2014	**The E-Poke system for Winter Maintenance on the Zilwaukee Bridge** - In the past the Zilwaukee Bridge had only one truck available for de-icing, now they have a second truck that is equipped to apply material. This allows for a spare truck if one goes down or the use of both to complete the application process in half the time.	$50,000		
2014	**Tow Plows on I-75** - Use of tow plows for winter maintenance. This can do the same amount of snow removal and salting as another truck would do. Response time to a storm event on I-75 is quicker and more efficient as only one operator is needed to remove snow and/or apply product to two lanes of roadway.		$170,000	
2014	**Concrete Patch Drilling** - Concrete pin drill with the 3 drills on it, opposed to the drill with just 1 on it, cuts drilling time in half. This reduces the time in drilling and allows maintenance crews to complete work sooner which in turn reduces the cost of repairs.	$12,000		
2014	**Pre mixing salt** - Pre mixing salt with boost, allows salt to work faster, which aids in the amount of time it takes to clean up a winter storm event. Pre wetting salt also reduces the amount of salt that needs to be applied and helps keep salt on the roadway instead of scattering out of lanes.	$36,500		
2014	**Bay Region Communications** – Using smart phones for email, text, camera, and internet provide faster maintenance response.	$12,000		
2014	**Utility usage** - Bay Region disconnected one phone line and one fax line in 2014.	$1,613		
2014	**Mobile Office Technician** - Bay Region has been doing Office Tech from the field using mobile devices. This allows him to spend more time on site working with the inspectors, giving guidance, and being familiar with the projects he does paperwork on.	$6,000		
2014	**Alternative Technical Concept (ATC)** - Bay Region used ATC for Maintenance of Traffic (MoT) on freeways. This approach allows the contractor to come up with alternatives to maintaining traffic (via an approval process) while at the same time keep costs to a minimum and maximizing construction efficiency.			$3,000,000
2014	**Salt Reporting** - Bay Region began using a salt reporting schedule which was created by a Maintenance Superintendent. By tracking the salt usage monthly, we are able to track how much salt was used per winter storm event. This helps track remaining salt levels we have in storage. This systems also makes it possible to determine the rate of salt being applied and adjustments that can be made to keep aligned with required/recommended usage.	$1,000,000		

Year	Description	Annual MDOT Savings	One-Time MDOT Savings	Annual Savings to Others
2014	**Building Utility Usage** - Beginning in May 2013, graphs were displayed showing utility usage at multiple Bay Region facilities. This was an easy way to track all utility usage and the graphs will alert us to any spikes in usage.	$1,200		
2014	**Safety Project** - M-20 boulevard safety project. This safety project is for the construction of a boulevard to eliminate all left turns at the traffic signal at Leaton Road. This intersection leads directly to the Soaring Eagle casino and gets very busy during events and certain times of the week. The Saginaw Chippewa Indian Tribe was interested in continuing the boulevard westerly for their own benefit and traffic control, and contributed $1.6 Million as a result. Due to the added safety, MDOT fully supported this. Bay Region coordinated the two safety project with local Indian tribe and Bureau of Indian Affairs. This was the first time for such a coordination project between MDOT and BIA.		$1,302,300	
2014	**Stringless concrete paving** - MDOT uses stringless concrete paving on I-75, including the use of LIDAR for quantity determinations at intermittent layers of construction. This included scanning the existing pavement, subbase and aggregate base, HMA interlayer and final concrete construction. This method is being used for very precise measurements of quantities and tolerances. This project also made use of the Alternate Technical Concepts (ATC) process for the contractors to submit their own concepts for maintaining traffic within the given guidelines for safety and mobility.		$1,000,000	
2014	**LIDAR surveying** - The US-10BR (Eastman Avenue) reconstruction in the city of Midland was a design build project that made use of LIDAR surveying to expedite the surveying by two months and compile a cost savings of $30,000.		$85,000	
2014	**Salt boxes with Auger** - Bay Region is using salt boxes in trucks with an auger rather than flight chain for more accurate salting. This will increase our ability to place the appropriate amount of salt in the needed areas.	$100,000		
2014	**Reconfiguring of the interchange of I-96 and US-23** - Reconfigured to eliminate merging traffic on mainline I-96. A new four lane I-96 freeway section will be constructed in the middle of the existing I-96 roadway and the existing roadway becomes a collector distributor road. This innovative approach to improving the operation of this very busy interchange also improves safety with less cost and disruption to the traffic and residents than the recommended alternative from the previous study of a complete reconstruction and reconfiguration to a full cloverleaf interchange.		$80,000,000	

Year	Description	Annual MDOT Savings	One-Time MDOT Savings	Annual Savings to Others
2014	**Concrete "Take-Off" Calculator** - A spread sheet was developed to convert concrete pay items from the proposal into concrete quantities volumes for the different mixes. Concrete volumes are useful in planning lot size and testing quantities. Conversion from pay quantities individually require referencing different standard plans and special details, and hand calculating each pay item in turn. We estimate approximately $2,500 will be saved during a construction season in meeting preparation time.	$2,500		
2014	**E-Mail Pre-Production Meetings** - Pre-production meetings for small quantity jobs are held by sending agendas out to interested parties and soliciting comments via e-mail. Comments are then synthesized into final minutes and distributed. The method saves everyone time and transportation costs. Estimated savings of approximately $2300 per year could be realized to MDOT. Additional savings are realized by the contractors and suppliers involved.	$2,300		
2014	**ADA Ramp Design Tool** – A spreadsheet was developed to assist with the many repetitve calculations of the proposed grades and slopes when designing an ADA ramp. The spreadsheet provides a quick calculation and visual output that allows the designer to easily see where the design does not meet current specifications.	$100,000		$100,000
2014	**Online Utility and Right of Way Permiting Using the Construction Permit System (CPS)** - MDOT transitioned from permitting via paper and postal mail to permitting exclusively online. The bulk of the monetary savings are related to time processing via paper and preparing mail related to the permits.	$3,000		
2014	**Cross-Working in Permit and Construction** – Staff taking on role of inspector for construction projects saving need to hire consultants.	$120,078		
2014	**Sign covers required during construction** - Using three standard sign covers on the ground mounted speed limit signs eliminate the cost and time associated with designing and fabricating the Type 1 sign covers. 3 standard sign covers= $60 1 Type 1 Sign Cover= $1500	$54,720		
2014	**Adopt-A-Highway** - Seven landfills are currently serving the MDOT Southwest Region's AAH program at no cost. The overall cost savings of this best practice is estimated at $14,145 each year (which varies from season to season).	$14,145		
2014	**Tungston Underbody Blades instead of Steel Blades** - Four truck were retrofitted with tungsten underbody blades that last 3 times longer and only need to be replaced every 3 years, unlike the 9' steel wing blades, which require replacement approximately 3 times per year. Other variants include recycling and reusing center blade plows from trucks as wing-blade spares for other snowplows.	$3,948		

2014 Innovations - Unquantified Savings
Portadam™ Cofferdam Water Diversion System - Projects requiring a water diversion system typically use concrete barriers and sheet piling. On Project 118262A, the contractor opted to try Portadam's portable cofferdam equipment, which consists of a series of interconnected metal frames that support a laced and interlocked tarp. The water from the river was 100% diverted from the work area. While the work area did require some pumping to discharge ground water, the cofferdam increased safety because the work area was visible, and fewer water pumps were needed resulting in fewer electrical cords and discharge pipes. There was a smaller volume of discharge from the work area, and there was an increase in the contractor's production due to the larger work area.
Optional Precast Concrete Substructure - A change to standard job practices was made that allows the Contractor to decide if precast substructure units are a cost effective alternative to cast in place of concrete.
Laser Scanning - When a precise vertical clearance is needed for a railroad track under an expressway, a survey grade static laser scanner can be used to measure the vertical clearance between the bottom of the bridge and the top of the rail without having to physically occupy the railroad location. This increases the safety for the surveyor, and saves time and money because a spotter from the railroad company is not required.
Safety Lights for Wing Blades - LED safety light mounted in snow plow truck's wing blade to increase visibility when plowing large amounts of snow, allows driver to see outside edge of wing blade, reducing damage from hitting obstructions.
Safety Improvements - The Bay Region has given approximately 30 presentations on Toward Zero Deaths to raise awareness and hopefully change driver behavior. These presentations have been given to MDOT staff, AASHTO, MSP, County 911, Local Officials and Service Groups in the last 18 months.
Safety Improvements - The Bay Region Partnered with Thomas Township, MSP and Saginaw County Sherriff to invest in safety improvements on M-46 in Saginaw County. An additional part of this safety initiative was the creation of a safety coalition and a "Stay Safe. Drive Smart." Campaign aimed at enforcement of red light running, seatbelt usage and speeding along the corridor.
Construction Staffing - Developed construction workforce planning tool which is now utilized statewide to staff appropriately for the upcoming construction season. This determines staff necessary for the upcoming construction program and can be used as a decision making tool for hiring co-ops, consultants or moving staff between offices to handle construction oversight.
Electrician Staffing - Developed electrician workforce planning tool which determined permanent staffing for electricians statewide. The tool utilizes an asset based approach to determine necessary staffing for electricians to maintain our electrical devices.
Maintenance Staffing - Developed maintenance/sign workforce planning tool which determined permanent staffing for maintenance statewide. The tool utilizes an asset based approach to determine necessary staffing for maintenance workers to maintain our sign inventory.
Enterprise Asset Management Solution - Developed a request for proposals to outline functionality and requirements of a department wide asset management system. By managing assets across the department, MDOT can improve utilization and performance, reduce capital costs, reduce asset-related, operating costs, extend asset life, and subsequently improve MDOT's return on assets.
Prompt Payment - The Bay Region implemented a prompt pay check process to insure that contractors on MDOT and local agency projects are being paid promptly. This process includes spot checks on pay items to make sure payments are done timely and has created improvements in the region.

Maintenance Decision Support Systems - GPS on trucks-AVL, and the Maintenance Decision Support System app. (MDSS) management tools allow for solutions to be found that meet maintenance decision making needs. The Meridian state-of-the-science MDSS provides detailed and accurate information on each route. This enables effective maintenance on roads while optimizing resource use and reduces costs.
Intelligent Transportation - Message boards on I-75, help to notify the general public on crashes or roads/ lanes closures. This allows the motorist ample time to move out of a closed lane, make the decision to seek an alternate route or be prepared to slow down coming up to a lane closure; which help reduce the number of secondary incidents that may occur.
Mid-term Incentives - Special Provisions that award/penalize contractors if certain mid-term open to traffic date are met or not met.
Thermal Integrity Profiler (TIP) - Vassar Bridge Monitoring, caisson TIP Testing and Crosshole Sonic Log (CSL) testing. Both methods are being used to determine best practices and future uses to eliminate air pockets in the caisson foundations.
Time Sequence Cameras - Bay Region M-20 roundabout safety project in Midland. Time sequence cameras were installed on the project to take periodic pictures showing construction over time. We are currently working through a software issue with the graphics area. The completed time lapse "movie" should be rolled out at the High Impact presentation.
Pavement Marking Shields - The 2014 pavement rehabilitation project on I-75 in Genesee County included the installation of pavement markings of freeway medallions within lanes to assist drivers in knowing which lanes they should be in prior to the I-75/US-23 split in the freeway.
Dispute Resolution Board - The 2014-15 I-69, M-54 to Center Rd, reconstruction project included piloting Dispute Resolution Board (in lieu of traditional claim process) as well as an innovative Right of Way plan submittal process.
Fluorescent Barrels - I-69, M-54 to Center Road, reconstruction project piloted the use of fluorescent barrels. Traditional barrels were used on westbound – that looked dirty compared to fluorescent barrels on eastbound. Contractors and inspectors stated they felt safer with the fluorescent barrels. It was also said that they are more visible in rainy/wet conditions.
Communication Email Updates - Bay Region Operations initiated an email list by county to forward any communication updates to participants. The participants were added to the distribution list at their request – following the TSC inquiry of interest. Participants include local agency partners, emergency responders, schools, media partners, residents, and businesses. These communications often created further email responses and follow up.
CADD Development Team - Susan Phillips (Bay Region Design) is co-chair of a new statewide CADD development team to improve the design development process.
Work Group E-Mail Profiles - An e-mail profile MDOT-SW-Materials@michigan.gov was created for people to mail materials related documents to. A similar one is planned for the SW Region HMA group.
Teleconferencing Pre-Production Meetings - Telephone conferencing technology is used to allow contractors and supplier representatives the option of calling into pre-production meetings, thus saving them time. Contractor representatives often travel across the state to attend meetings. Since these meetings are relatively short in duration, this technology saves them greatly in time and transportation costs.
Increase Minority and Women Teachers and Interns in TRAC Program - Created a statewide list of teachers and interns participating in the TRAC program with contact information, place of employment, gender, and whether he/she considers themselves a minority. The data directed the focus of the outreach program to encourage the TRAC program goal of more participation from minority and/or female teaches and interns.

Local Agency Contact Information - Created and monitor the ever changing contact information of local agency employees in a shared database which can be updated by TSC and Region personnel. The contact list is a shared list in Outlook and is available on iPhone devices. The Outlook contact list is always current and updates with no user effort. The contact list is electronic and no paper is used, saving time and also simplifying work. This method will be suggested to other Region contact lists also.
Winter Performance Monitoring - In an effort to reduce material consumption during winter, my work unit is utilizing performance metrics and processing data in new ways to find outliers in MDOT winter operations. This past fall, we developed a storm severity index so that comparisons of salt usage with respect to varying levels of winter across the region can be made. This information is updated weekly instead of after the completion of winter so that adjustments can be made during the season. Essentially, utilizing specific storm characteristics, each storm has a value calculated on a 1-10 scale to provide a measure of the intensity of that storm. We also utilize the total number of hours of winter storms when comparing one area to the next. This severity value is compared to the amount of salt that is placed per lane mile which can give a basic comparison between areas on how their salting practices compare to adjacent areas. There is no 'target' value however this approach does find trends from one area to the next. With this report, we also provide a dashboard glance of how garages are performing to date on following the salting speed advisory. Getting the perspective of each garage on one report can also spot trends in order to make corrections as necessary.
Call For Projects - Capital Preventive Maintenance (CPM)- Projectwise: The Call For Projects Process was modified to have all submittals, correspondence, and acceptance of each CPM project done in projectwise. This has reduced approval time as well as documented all correspondence in one location instead of multiple emails and phone calls.
HMA Specification Modifications: Mix design modifications requiring fine graded surface course mixtures. Requirement to field regress air voids to 3% which will require additional AC in the HMA. These will reduce surface cracking and increase pavement performance. Modified asphalt cement grade for Capital Preventive Maintenance Projects which will reduce cracking resulting in longer lasting pavement treatments.
Utility pavement cuts - MDOT desires to have pavement cuts replaced with like materials so that future rehabilitation or maintenance activities are minimally impacted. Utility pavement cuts in composite pavement during the winter can cause a need for repeated patching efforts until the permanent fix is made in Spring. Past practice (during winter) was to bring the concrete up to adjacent concrete pavement grade, let it cure and cover with cold patch material until Spring when Hot Mix Asphalt (HMA) is available. At that time the cold patch is removed and replaced with HMA. In December '14 the City of Coldwater used a two inch temporary concrete layer over a plastic separator in place of cold patch. The top layer of concrete will be removed and replaced with HMA in the Spring. As of late January the temporary patch still looks great. A two inch layer of cold patch typically requires multiple repairs during the same period. Savings difficult to quantify.
Digital Pen - US-10 Bridge Replacement over Nine Mile Road in Bay County included some innovations during the design phase including: using Digital Pen for Plan Reviews; consolidating/reducing number of forms needed for project submittal; pilot project for new ProjectWise folder structure and ProjectWise workflows; ROW plan submittal. Many of these innovations will become standard practice in March 2015 based on the success of this project.
Wing plows - Wing plows were installed on winter maintenance trucks. This lets the operator clear a lane and shoulder or a ramp with one pass instead of making a second pass. By reducing the number of passes you reduce the amount of time it takes to clean up a winter storm event.
Aggregate and Hot Mix Asphalt (HMA) (equal parts) - US-10: Concrete patch repairs were completed using ½ depth of aggregate and ½ depth HMA – to allow for same day opening to traffic. This greatly increases the mobility of the traveling public, versus closing the project for the concrete to cure out for 3 days.

Welcome Center ITS - The New Buffalo Welcome Center installed an intelligent transportation sstem to let truck drivers know how many parking spots are available at any given time. This effort is aimed at reducing driver fatigue, which contributes significantly to crashes.
Hard Shoulders - The Bureau of Transportation Planning staff participated in the analysis of using hard shoulder running on I-96 (Oakland County) and US-23 (Livingston and Washtenaw counties) as a way of utilizing innovative technology to manage peak hour traffic congestion resulting in improved traffic flow and safety along the corridor.
Fixed Price Variable Scope (FPVS) - Many region used the innovative contracting concept of FPVS withing the CPM program as a method to gain the maximum amount of improvement with the available funds. In the North Region FPVS project is planned for late in the fiscal year, to utilize any funds remaining from favorable bids in the program, and results in more efficiently using employee resources in an existing planned project rather than developing a new, separate project. Bay Region had five FPVS projects on bridges, crack seals and chip seal projects. The University Region is considering for the I-69 portion of Eaton County. This approach also maximizes performance in the region strategy by increasing the lane miles of work applied.
Truck Parking ITS - MDOT deployed the Truck Parking ITS signs which provide valuable parking availability data to truck drivers, helping to ensure optimum, on-time freight movement, and improving safety by helping drivers find safe places to park and rest.
Monroe County I-75 Reconstruct - MDOT plans to reconstruct I-75 in Monroe County, a sensitice environmental area very close to Lake Erie, an imperiled water body. MDOT obtained a federal grant to develop a conservation plan for the corridor that includes partnering resource and regulatory agencies with the goal of streaming the environmental permit process. The two-year initiative paid off in the first year when MDOT was able to transplant 1,500 state threatened Milkweed plants to MDNR's Sterling State Park's prairie restoration area from the freeway right-of-way.
User Delay Cost Limiting WIG - The Southwest Region set a WIG to limit the user delay cost for travelers on I-94, I-196, I-69 and US-131 by reducing and eliminating delays caused by incidents, work zones, and winter weather. Daily, employees focused efforts on three lead measures involving 1) quickly clearing traffic incidents, 2) optimizing work zone maintenance of traffic schemes, and 3) regaining traffic speeds during morning rush hours durning snow events.
Construction Project Average Age Reduction - The Bureau of Finance and Administration's WIG was to reduce the average age of completed construction projects awaiting financial closure from 1.8 years to 1.0 year.
PowerGEOPAK SS3 - The Design Services Section developed tools and resources to implement PowerGEOPAK SS3 for enhanced automated mapping, parametric roadway and densign drainage design. This effort will further enable the development of 3D engineered models and electronic engineered data for delivery to construction and beyond.
I-96/US-23 Interchange Layout - The University Region created the new interchange layout with contracting methods used on the I-75 project in Monroe County, using Alternate Technical Concepts to maximize the performance of maintenance and traffic.
Geosynthetic, Reinforced Soil (GRS) Integrated Bridge System - In partnership with the FHA and Ionia County, MDOT's Bridge Development Section showcased a construction that is a promising new bridge substructure that will allow MDOT and local agency bridge owners to build small to medium span bridges quicky with reduced cost.
Diverging Diamond Interchange (DDI) - The Grand Region and Lansing staff have begun design at Cascade Road and I-96. The design will have operational and safety benefits, as well as required teamwork with MDOT, County, Local, and FHWA partners.

Freeway Lighting System - MDOT continued to upgrade lighting to energy efficient LED luminaries, including high profile project areas such as I-96 from I-275 to US-24, the Zilwaukee Bridge, and High Mast light towers at I-75 and US-2.
Public Private Partnership - The Superior Region pursued a public-private partnership for managing timber within portions of MDOT Right-of-Ways.
M1 Rail Partnerships - The rail project complements and enhances the redevelopment already occuring throughout Downtown and Midtown Detroit, and made possible through a unique partnership between private, philanthropic, local, state, and federal agencies.

Year	Description	Annual MDOT Savings	One-Time MDOT Savings	Annual Savings to Others
2013	**International Bridge** - Bridge maintenance crews completed work in-house for 40% less than the estimate from an out-side contractor.		$153,584	
2013	**Wounded Veterans Program** - MDOT currently employs 8 wounded veterans through a program where their salary is paid by FHWA for up to two years saving MDOT $200,000.		$200,000	
2013	**Office Space Consolidation** - Achieved cost savings from office space consolidation of $729,514/year through the cancelation of 2 leases in the Lansing area (Lansing TSC $242,847, Photolab $486,667)	$729,514		
2013	**Sign Recycling** - Recycling old signs cuts the cost of signs by approximately 50%. This program is a collaboration between MDOT and MSI, our primary sign supplier.	$57,000		
2013	**Adobe Connect** - Using Adobe Connect for web meetings, trainings, and webinars to reduce travel expenses.	$818,510		
2013	**Supplier E-Mail Summaries** - Aggregate suppliers are now emailing in their weekly summaries instead of mailing. This is saving MDOT an estimated $15,000 per year in manual printing, filing, and tracking expenses.	$15,000		
2013	**E-SIGN** - Savings were greater than anticipated from this 2012 innovation. An additional $2.6 million in savings was realized over the $4 million reported for 2012.	$2,600,000		
2013	**MDOT Construction Manual** - The hard-copy version of MDOT's Construction Manual was last updated in 2003, and consists of 350 pages and weighs about five pounds. In 2012, there were 766 addendums to the manual, which required printing and manually updating thousands of pages. Electronically updating the manual saves hundreds of hours of staff time each year, and eliminates substantial printing costs.	$365,000		
2013	**Maintenance Contracts** - Reducing maintenance contracts for street sweeping and HMA overlays on freeway ramps saved $900,000.	$900,000		
2013	**Interactive Communication and Meetings** - Using applications like GoogleEarth and other technology during meetings improves speed, accuracy, and communications during meeting. This also saves on paper costs and results in less time in the field.	$660,000		
2013	**Inspection Flow Charts** - New flow charts are being used to streamline the inspections process for structural steel and precast concrete.	$15,000		
2013	**Epoxy Injections** - A new procedure was used on some bridges with deteriorated surfaces. Instead of resurfacing a bridge deck, an epoxy was injected to re-establish the bond between the deck and the overlay concrete.	$100,000		

2013	**MiBridge** - Combining the Michigan Bridge Reporting System (MBRS) and Michigan Bridge Inspection System (MBIS) software platforms helps the Department better amange and schedule bridge inspections and notify localagency owners of deficiencies. This is also contributing to the National Bridge Inspction Standards (NBIS) compliance requirements.	$80,000		
2013	**Signals** - Completely switched the dynamic mesasge board signs to LED lights.	$64,000		
2013	**ProjectWise** - Utilizing ProjectWise to transfer agreements and send large documents has saved on printing and mail costs.	$20,000		
2013	**Recycling Scrap Metal** - The scrap metal salvage program has saved $343,000 in five years. Annual savings of $86,000	$86,000		
2013	**e-Construction** - First agency in the country to pilot "paperless construction projects" which require contractors to submit all their construction documents electronically to MDOT's document management system, and mandated the use of digitally encrypted electronic signatures. Cost savings from one pilot project involving an interchange totaled more than $185,000, with approximately $100,000 in savings for MDOT and $85,000 for the contractors. It's also estimated to eliminate 170,000 pieces of paper and 150,000 days of mail time.		$100,000	$85,000
2013	**Maintenance Decision Support System (MDSS)** - The MDSS enables the Department to make better informed decisions before and during winter weather. The system is a combination of sensors mounted on winter maintenance vehicles that relay information back to a software program that gives employees accurate data about the condition of the roads, in real time. This increases the efficiency of salting and plowing.	$100,000		
2013	**Tow Plows** - Tow plows are a new plowing equipment and technique in which an additional plow is attached to the side of a plow truck. Tow plows allow for less trucks, staffing, and fuel as they plow amost twice the amount of area versus standard plows.	$200,000		
2013	**Precast Concrete** - By using precast concrete, lane closures were reduced during a project on I-94 which saved $11.6 M in user delay costs. Precast concrete is also expected to last three times longer than standard concrete repairs.			$11,600,000
2013	**e-STIP** - Electronic State Transportation Improvement Program (e-STIP) allows MPOs to enter project information via a web-based application. Between $11,000 to $14,000 saved by removing the duplication of effort and allowing MPOs to enter the data for local projects.	$14,000		
2013	**UP Shuttle** - Operating the Upper Peninsula air shuttle has saved the state 2,000 hours of lost productivity and an estimated $75,000 in direct costs.			$75,000
2013	**Zilwaukee Bridge Project** - Additional savings on Z-bridge project using Construction Manager/General Contractor (CM/GC) process, completion scheduled for late 2014. Previously reported $2.45 million in savings in 2012.		$1,150,000	

2013	**Mobile LIDAR** - Surveying projects using mobile LIDAR could reduce surveying costs by 40%. A project in the Bay Region used this new technology to survey a 7 mile stretch of rural freeway for an upcoming project. The technology reduced on-site crew hours and in-office processing work and saved approximately $43,000.		$43,000	
2013	**Loader/Grader** - Southwest Region is using a loader outfitted with a plow and wing to determine if this equipment combination, during intense snow events, can push open closed roadways and bench snow. If proven effective, the department's fleet of grader's with plows and 12' blades, when no longer repairable, can be turned in for salvage or sale and be replaced with this equipment combination, thereby saving the Department $100,000.	$100,000		

2010-2013 Innovations - Unquantified Savings
Data Use Analysis and Processing (DUAP) - Develop applications using connected vehicle data that improves the way transportation agencies do business. MDOT has identified more than 50 possible applications, and is narrowing down the potential candidates.
Critical Infrastructure Monitoring Project - Working with University Partners (Michigan State, Michigan Tech), MDOT developed and installed sensors, communciations means and applications so structurally monitor the Cut River Bridge in the Upper Peninsula.
Partner OEM Diagnostic Fleets - MDOT has partnered with vehicle manufacturers to allow for the collection of mobile data from a fleet of diagnostic vehicles, in return for MDOT development of a wireless data collection environment. Examining this data along with other external data can help to describe the driving conditions at a specific time and place.
Integrated Mobile Observations (IMO) - IMO 2.0 is a project funded by the FHWA Road Weather Management Program, as a grant to MDOT, the lead agency managing the project. The project uses data generated by the vehicle and cellular phones to develop weather/winter maintenance-related applications.
I-94 Truck Parking Info and Management Systems - MDOT is completing a system that will assess truck parking availability along the I-94 corridor in southwest Michigan and deliver near-time parking availability information to truck drivers using Dynamic Truck Parking Signs, MDOT's web-based traveler information website MiDrive, a smartphone application, and on-board Connected Vehicle equipment.
USDOT Development and Test Environment - With 58 roadside units, the Connected Vehicle Development and Test Environment (DTE) deployed by the USDOT in the Novi area is by far the largest single deployment of Connected Vehicle assets in Michigan. MDOT continues to support the maintenance of this test environment for use by the USDOT and automotive companies.
USDOT Safety Pilot (Ann Arbor) - The Safety Pilot project is a joint effort between the U.S. DOT, the University of Michigan Transportation Research Institute (UMTRI), MDOT and other public and private entities. It is a project that is designed to test the maturity and feasibility CV Vehicle to Vehicle (V2V) and Vehicle to Infrastructure (V2I) technologies and systems. The USDOT has agreed to continue supporting the system designed as part of the Safety Pilot beyond the originally defined study timeframes.
Advanced Traffic Management System (ATMS) Software - MDOT has deployed a comprehensive, statewide software system that operates ITS devices seamlessly, across the state; a user with appropriate access can access and operate the devices from any MDOT office across the state.
Mobility Transformation Center - MDOT is supporting the development of an automated and connected vehicle test track and environment on the north campus of the University of Michigan. This facility will be accessible to MDOT for the testing of new technologies and applications.
TARDEC - MDOT has finalized a cooperative research agreement with the US Army to test automated vehicle technologies on MDOT roadways that would be applicable and used for civilian/mobility applications.
Travel Times/Probe Data - MDOT has developed real-time, accurate travel times that are provided to motorists on freeways via dynamic message signs, and our traveller information website, MiDrive.
Automated Vehicle Testing Support - MDOT has supported the development and testing of automated vehicle technology in Michigan, including helping craft legislation that opens up the ability of technology companies to develop and test automated vehicle technologies on public roadways in the state. MDOT is also exploring partnerships with private and public partners on designating specific corridors in the state as automated vehicle test corridors.
Border Wait Time - MDOT is working in conjunction with Transport Canada and the Ontario Ministry of Transport to implement cross-border wait time measurements at the major border crossings between Michigan and Ontario. Initial focus is a the Blue Water Bridge, with a future application at the International Bridge.

Risk Based Audit Approach - Risk based audit approach is primarily based on addressing financial risks at the front end of the process through the financial prequalification process. This approach also eliminated the need to audit each project at the time of contract close-out.
Time Reduction for Consultant Payments - By requiring staff and supervisors to process payments more quickly and tracking progress towards this goal. Payments to contractors were reduced from as much as 75 days to as few as 10-20 days.
Consultant Invoice - Team developed comprised of MDOT and ACEC representatives to simplify and streamline the consultant invoicing process. A standardized invoice document was created and piloted by six companies. This new process eliminates additional pages and inconsistency of documentation.
Longitudinal Joint Specification - Specification results in increased density which will lead to longer lasting pavements. Cost savings difficult to determine.
Warm Mix Asphalts - Allows longer hauling distances and assists with compaction of HMA which will lead to higher densities and increased performance. Cost savings difficult to determine.
Increased RAP Usage - Cost savings difficult to determine.
Permissive Shingle Usage - Cost savings difficult to determine.
Gap Graded Superpave - Revised specification to allow for 1.5" applications which will result in cost savings, difficult to determine.
Rapid Set Concrete Pavement Repair - Allows for opening to traffic quicker with consideration of patch performance. Cost savings difficult to determine.
Intelligent Compaction - Compaction of road materials using modern rollers equipped GPS, accelerometers, and other on-board computing technology. This will create a superior base layer extending the life of the pavement. A pilot project to asses the benefits was conducted in 2013.

Year	Description	Annual MDOT Savings	One-Time MDOT Savings	Annual Savings to Others
2012	**Restructure STF** - MDOT restructured the State Trunkline Fund (STF) refunding bond deal to obtain a lower interest rate on debt; the new rate saved over 16% or $9.4 million. The debt service savings was front loaded in FY 13 at $2.6 million and just over $810,000 debt service savings from FY14 through FY22.		$2,600,000	
2012	**Bicycle Maps** - MDOT has reduced the number of bicycle maps it produced from 96 county and city maps to 11 regional maps. The savings in printing costs alone have been approximately $838,000. Savings have also been realized in reduced storage costs and decreased mailing expenses.		$838,000	
2012	**Carpool Lot Partnership** - MDOT continued its partnership with Meijer Corporation to add a 15th store to the carpool lot agreement. The store, located in Wyoming Michigan, will provide parking for up to 50 commuters and save the Department approximately $300,000 in construction and real estate costs. This partnership model has also been used in the Upper Peninsula; MDOT has agreements with four local businesses that provide parking capacity for commuters. Since 2008, this partnership has saved approximately $4.5 million in real estate and construction costs.		$300,000	
2012	**Wounded Veterans Program** - MDOT and FHWA recently joined forces to recruit and hire skilled wounded veterans for temporary positions – at no cost to the state. Qualified wounded veterans are hired for positions in MDOT that best use their skills and training, and FHWA pays their salary for up to 6 months. Currently, MDOT plans to employ as many as 10 wounded veterans at a potential savings to the Department of $150,000 over six months.		$150,000	
2012	**Snowplow Speed** - MDOT is revising snowplow speed guidelines to improve snow removal and de-icing, which is expected to save $13 million annually.	$13,000,000		
2012	**E-Sign** - MDOT's Chief Operations Officer, Bureau of Field Services, Transportation Service Centers, Design, and Aeronautics have used digital electronic signatures (e-sign) for construction documentation on more than 40 documents, saving up to three weeks of processing time per document and eliminating 7.4 million sheets of paper. Future savings will be significantly greater as more processes move to electronic signatures, and as other MDOT divisions and bureaus begin full implementation of e-sign. MDOT is only in the beginning stages of e-sign, and has already saved over $2 million in the first six months with more savings anticipated the rest of the year.	$4,000,000		
2012	**Asset Management Contracts** - The Asset Management Division reduced annual contract costs by using a qualifications-based low-bid vendor selection process for pavement surface data collection projects. This includes changing the scoping process to require a new sampling technique for surface condition assessments. MDOT is able to save money by reducing the sample size of pavement data collection to 30%.	$380,000		

Year	Description	Annual MDOT Savings	One-Time MDOT Savings	Annual Savings to Others
2012	**Maintenance Strategy** - As part of a proactive maintenance strategy, Oakland County TSC has been performing heavy surface repair to minimize maintenance costs, minimize damage claims against the Department, and improve mobility. This strategy has resulted in considerable cost savings, 19 fewer damage claims, and 93 fewer closures since 2011.	$327,000		
2012	**Enterprise Asset Management** - The Asset Management Division implemented the early stages of the Enterprise Asset Management program for non-pavement and non-bridge features. In addition to a lane mile inventory, this included loading over 135 asset classes to a central ArcGIS Server database that supports various business areas across the Department. By making this resource available via free software (ArcGIS Explorer), the Department was able to replace the fee-based Google Earth and Transportation Asset Mapping System (TRAMS) II programs.	$250,000		
2012	**Stringless Paving** - Stringless paving is a new construction method that uses digital technology to accurately direct the paving equipment on-site, reducing the amount of preparation work and on-site surveying. By using this new technology, crews can more quickly and accurately establish the correct alignment and profile for the pavements. This new technology was tested in 2012 on a project in Bay County; it enabled MDOT to complete a two-year project in one year, with savings of $210,000. This project also decreased user delay due to the expedited schedule.	$210,000		
2012	**Bridge Joints** - New tools and technologies are being used for the bridge joint installation process that has reduced costs by 40%, reduced construction time by 50%, and provides a better surface condition after construction. The savings are based on eight projects conducted in the Grand Region during the 2012 construction season. This technique could be applied statewide.	$78,000		
2012	**Rest Areas** - The North Region has contracted the operations activities of six rest areas and two roadside parks. Private contractors perform services such as cleaning, mowing, and staffing on holiday weekends, which has reduced operating costs at those locations by two thirds. The contractors are also required to supply all the materials needed for the facility. Two more rest areas will be contracted out in spring 2013.	$660,000		
2012	**Employee Resources** - The North Region shared employee resources between offices for a major project in West Branch which reduced the need for consultants, saving time and expenses. The project utilized incentive-disincentive and user delay provisions that reduced motorist delay and business impacts.	$60,000		
2012	**Weed Control** - New weed control techniques are being used in the Grand Region area to inhibit the growth of roadside vegetation. This has reduced the amount of mowing by up to 50% in one growing season. There is potential for this technique to be used statewide.	$192,000		

Year	Description	Annual MDOT Savings	One-Time MDOT Savings	Annual Savings to Others
2012	**Zilwaukee Bridge** - MDOT is using new technology and products for Zilwaukee Bridge repairs which will result in significant cost savings. MDOT is using previously built beams, previously built scaffolding, and the thinnest bearings possible. These products allow the Department to complete the necessary repairs without making major modifications to the existing structure.		$2,450,000	
2012	**Salt Purchases** - Bay Region developed a projection module spreadsheet that gives predictions of salt usage based on the current year's usage trend and on the five year usage average. This allows MDOT to keep the amount of salt purchases to a minimum.	$470,000		
2012	**Bascule Bridges** - The Bay Region contracted the operation and custodial services of two bascule bridges in Bay City. These bridges are M-13/M-84 (Lafayette Bridge) and M-25 (Veteran's Memorial Bridge), both are over the Saginaw River. The contractor will be required to operate these bridges as necessary and as required by law, and to provide custodial services at the bridges.	$200,000		
2012	**Impact Attenuators** - The Oakland County TSC has been replacing damaged impact attentuators (impact cushions on fixed structures) with self-restoring reusable attenuators which have reduced repair and maintenance costs.	$160,000		
2012	**Guardrail** - The Oakland County TSC manages a contract with several private businesses to complete repairs of damaged guardrail. This work was previously conducted by the Road Commission of Oakland County. Since 2007 the private contracts have saved approximately $600,000.	$155,000		

Year	Description	Annual MDOT Savings	One-Time MDOT Savings	Annual Savings to Others
2011	**One-Time Savings** - Refinanced STF, CTF and Aeronautics fund bonds, other process improvements.		$6,900,000	
2011	**Reorganization** - Closed 8 facilities and left 15% of positions vacant.	$48,100,000		

Year	Description	Annual MDOT Savings	One-Time MDOT Savings	Annual Savings to Others
2010	**One-Time Savings** - Build America Bonds ($41M), restructuring CTF bonds, process improvements and other one-time savings.		$71,000,000	
2010	**Value Engineering** - Conducted on projects greater than $50 million; analysis identified savings of $27 million over 3 years, providing annual estimated savings of $9 million.	$9,000,000		